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WEF Residuals & Biosolids and Innovations in Treatment Technology Conference 2025

May 6-9, 2025

Baltimore Convention Center
Baltimore, Maryland

Technical Program

(updated March 17, 2025)

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Pre-Conference Workshops and Post-Conference Tour

Additional Fees Apply

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Workshops and Tour Fees

Item	Description	Date & Time	*Member	Non-Member	Student Member	Student Non-Member
Workshop A †*RB Focused* ‡*ITT Focused*	Poop to Power! Piscataway BioEnergy Facility - Overview and Tour of WSSC's Innovative Biosolids to Energy Facility	Tuesday, May 06 8:30am - 5:00pm	**$195.00**	**$225.00**	**$0.00**	**$175.00**
Workshop B *RB Focused*	Thickening Optimization - Process Improvements and Plant Benefits	Tuesday, May 06 8:30am - 5:00pm	**$195.00**	**$225.00**	**$0.00**	**$175.00**
Workshop C *RB Focused*	Biogas to Renewable Natural Gas - System Startups and Safety Protocols	Tuesday, May 06 8:30am - 12:00pm	**$100.00**	**$125.00**	**$0.00**	**$100.00**
Workshop D *RB Focused*	The Intersection of Collaborative Delivery and Biosolids Resource Recovery Projects	Tuesday, May 06 1:30pm - 5:00pm	**$100.00**	**$125.00**	**$0.00**	**$100.00**
Workshop E *RB Focused*	Thermal Drying: State of the Practice, Advancements, and Future Applications	Tuesday, May 06 1:30pm - 5:00pm	**$100.00**	**$125.00**	**$0.00**	**$100.00**
Workshop F *ITT Focused*	From Data to Decisions: Building Robust Governance Frameworks for Online Process Data	Tuesday, May 06 8:30am - 5:00pm	**$195.00**	**$225.00**	**$0.00**	**$175.00**
Workshop G *ITT Focused*	Design Considerations for the Implementation of Low Dissolved Oxygen BNR	Tuesday, May 06 8:30am - 5:00pm	**$195.00**	**$225.00**	**$0.00**	**$175.00**
Tour	CHAR Pilot Tour	Friday, May 09 12:15 pm – 2:30pm	**$60.00**	**$60.00**	**$60.00**	**$60.00**

†RB =Residuals and Biosolids
‡ ITT= Innovations in Treatment Technology

*You must be an active WEF Member to qualify for these rates. Join or renew today.

**Student Nonmember: To qualify for the Student Non-Member rate, you must provide proof of enrollment in a minimum of six (6) credit hours at an accredited college or university and provide written documentation on school letterhead, verifying your student status.

This conference will be hosted by the Water Environment Federation in cooperation with the Chesapeake Water Environment Association.

Pre-Conference Workshop
Additional Fees Apply

Tour-shop A: Poop to Power! Piscataway BioEnergy Facility - Overview and Tour of WSSC's Innovative Biosolids to Energy Facility
Tuesday, May 6, 2025
8:30 AM - 5:00 PM

Speakers: Stephanie Spalding, HDR; Josh Mah, Silvia Fuentes, WSSC; Manuel Moncholi, Stantec; Yewei Sun, Hazen and Sawyer

This workshop and tour will provide an overview of the WSSC Piscataway BioEnergy Facility. The workshop will start at the Convention Center where speakers from WSSC and the Consulting firms who assisted with project implementation will provide an overview of the drivers behind this groundbreaking program and the selection of the technologies implemented for thermal hydrolysis, anaerobic digestion, biogas utilization, and the first application of AnitaMox for sidestream treatment of a THP recycle stream in the United States. The late-morning and afternoon will be a comprehensive tour of these facilities that will have been in operation for over a year. Attendees will be divided into four groups and will visit four stations for 30 minutes each, comprised of 15 minutes overview presentation and then 15 minutes of Q&A.

Pre-Conference Workshop
Additional Fees Apply

Workshop B: Thickening Optimization - Process Improvements and Plant Benefits

Tuesday, May 6, 2025
8:30 AM - 5:00 PM

Speakers: Edward Fritz, Operators Unlimited; Rashi Gupta, Carollo Engineers; Dan Fronhofer, BDP Industries, Inc; Brett Offerman, Kemira Global; Mario Benisch, Elaine Leonard, Luke Thompson, HDR; David Oerke, Jacobs; Christine Hengel-Prom, Black & Veatch

Solids thickening is an often-overlooked operation in the wastewater treatment process. This workshop will focus on practical solutions to improve thickening performance for primary and waste activated sludge, including achieving thicker solids, better solids capture, reduced polymer consumption, reduced O&M costs, enhancing biological phosphorus removal, and provided smaller or more efficient downstream solids handling processes. This workshop will be of primary interest to plant managers, superintendents, operators and maintenance staff from municipalities. Furthermore, this workshop topic is critical and timely to the industry since municipalities are getting more pressure to reduce their budgets or to "do more for less" in addition to addressing the challenges of increasing polymer, and solids processing cost.

The information from the workshop will provide municipal attendees the knowledge and resources to better perform their jobs with lower O&M costs, will help consultants to provide more informative and better thickening equipment advice and will help manufacturers to provide better and more optimum machine performance at lower O&M costs.

Pre-Conference Workshop
Additional Fees Apply

Workshop C: Biogas to Renewable Natural Gas - System Startups and Safety Protocols
Tuesday, May 6, 2025
8:30 AM - 12:00 PM

Speakers: Jeff Prevatt, Pima County; Silvia Fuentes, WSSC; Erika Bailey, City of Raleigh

This hands-on workshop provides a comprehensive review of the leading biogas upgrading processes highlighting the most recent RNG facilities to come online. This workshop is developed to provide guidelines and best practices for treatment facility personnel engaged in the production and utilization of biogas, and the upgrading of biogas to RNG. Information provided is based on experiences of experts within the field reflecting state-of-the-art practices for the operation and maintenance of flammable gas systems in use at wastewater treatment facilities. The goal is to provide a portfolio of strategies and best practices related to biogas generation, operation, and maintenance of gas processing systems including anaerobic digestion, biogas safety equipment, and RNG production equipment up to the custody transfer into natural gas pipelines.

Pre-Conference Workshop
Additional Fees Apply

Workshop D: The Intersection of Collaborative Delivery and Biosolids Resource Recovery Projects
Tuesday, May 6, 2025
1:30 PM - 5:00 PM

Speakers: Vanessa Borkowski, Nicole Stephens, Stantec; Alan Parent, PC Construction; Paul Christy, CAMBI, Inc; Brian Balchunas, HDR

Collaborative project delivery (CPD), formerly known as alternative delivery, is a term encompassing a range of project delivery methods that involve integrating multiple industry partners into one collaborative team. Several collaborative delivery methods including Construction Management at-Risk (CMAR), Progressive Design-Build (PDB), and Design-Build-Operate (DBO) have become widely adopted across the water and wastewater industry and have demonstrated particular success for a subset of resource recovery projects involving biosolids. The workshop will provide a general topic introduction, define the approach for selecting a collaborative delivery method, and share perspectives from Owner, Contractor, Vendor, and Engineer. In addition, the workshop will draw on the experiences of key team members through case studies that have occurred in North America. The workshop will also include an interactive portion where the audience will support or refute selection of a certain delivery method for a fictitious project.

Pre-Conference Workshop
Additional Fees Apply

Workshop E: Thermal Drying: State of the Practice, Advancements, and Future Applications

Tuesday, May 6, 2025
1:30 PM - 5:00 PM

Speakers: John Ross, Brown & Caldwell; Chip Pless, Waste Management; Jody Barksdale, Carollo Engineers; Adrian Romero, Jacobs

Dryers have been used with marginal success for decades to dry sewage sludge. Many applications have succeeded, while others have not, for a myriad of reasons. Furthermore, there has been little data, research, analysis, and collaboration within the biosolids community compared to other biosolids processes such as dewatering or digestion. With the current state of biosolids in North America-including the cost of disposal and mounting regulations-drying technologies are increasingly being considered to create robust and sustainable biosolids solutions. Dryers excel in reducing disposal mass and volume, creating a Class A biosolid for land application, or preconditioning sludge for thermal destruction technologies. These attributes indicate an increase in dryer installations in the coming years. This workshop will bring together operators, technologists, and engineers with experience in drying applications to discuss the current and future state of drying. The workshop also welcomes those considering sludge dryers, as its goal is education and addressing key knowledge gaps that need exploration in sewage sludge drying. Additionally, the hope is to gather a community of dryer professionals to discuss and develop solutions to known drying issues, assisting current and future operators and exploring topics for discussion in future workshops. Topics explored during this workshop will include the current state of drying, with a technology overview of different dryers, including presentations from operators sharing their experiences and discussions on the end uses of dried products. This will feature a panel to discuss dried product management with experts and experienced operators, fielding attendees' questions. Other topics will address drying's future, including integration with high-temperature processes and ideas for greenhouse gas reduction in dryer operations. Finally, topics related to safety, such as dust hazards and emissions controls for dryer exhaust, will be covered. The day will conclude with breakout sessions at each table, where participants can discuss their own drying issues or questions, followed by a group discussion on the topics generated in those sessions.

Pre-Conference Workshop
Additional Fees Apply

Workshop F: From Static Data to Dynamic Decisions: Building Frameworks for Online Process Data Integrity
Tuesday, May 6, 2025
8:30 AM - 5:00 PM

Speakers: Jeffrey Hlad, Tanja Rauch-Williams, Metro Water Recovery; Adrienne Menniti, Clean Water Services; George Sprouse, Metropolitan Council Environ Serv; Keaton Lesnik, Maia Analytica; Jeffrey Sparks, Hampton Roads Sanitation District (HRSD); Dan Delaughter, City of Englewood, Colorado; Emily Zegers, City of Toronto

This workshop addresses a timely need for utilities and other industry stakeholders-including vendors, consultants, academics, and regulators-to share and analyze industry approaches for data governance of process data. For utilities, effective governance is vital to enhance internal trust in data and streamline workflow processes. For consultants, vendors, academics, and other stakeholders, understanding these governance challenges is crucial to providing relevant solutions, tools, and research that directly address the needs of the utility sector. This workshop will bring together key stakeholders-utilities, consultants, vendors, and academics-to address these critical issues. By the end of this workshop, participants will have collaboratively developed areas in which best practices for online process data governance can be outlined, identified key gaps in current practices, and discussed next tangible steps towards addressing the remaining challenges wastewater utilities face in managing, using, and ensuring the quality of process data. Although this is intended to be a 'working' workshop, and an important objective herein is to advance the state of the industry, there are also clear opportunities for education of participants as outlined below.

Pre-Conference Workshop
Additional Fees Apply

Workshop G: Design Considerations for the Implementation of Low Dissolved Oxygen BNR

Tuesday, May 6, 2025
8:30 AM - 5:00 PM

Speakers: Jose Jimenez, Mark Miller, Brown and Caldwell; Leon Downing, Black & Veatch; Lilian McIntosh, Alexandria Gagnon, Hampton Roads Sanitation District (HRSD); Belinda Sturm, University of Kansas; Leiv Rieger, Jacobs; Mehran Andalib, Stantec; Natalie Beach, Carollo Engineers

Low dissolved oxygen (DO) biological nutrient removal has the potential to improve effluent quality while significantly reducing the energy and chemical demands of WRRFs. However, there remain many questions around the fundamentals of design and operation considerations for the implementation of low DO BNR. This workshop provides in-depth insights into the design and engineering considerations for developing effective BNR systems that operate under low DO conditions. As wastewater treatment plants seek to balance operational efficiency with energy savings, the ability to design systems that maintain nutrient removal at low DO levels becomes increasingly crucial.

Key topics will include:

- **Fundamentals of BNR at Low DO:** An overview of the biological processes, including nitrification, denitrification, and phosphorus removal kinetics, and how they are affected by low DO environments.
- **Microbial Selection and Kinetics:** Designing systems to promote the growth of nitrifying and denitrifying bacteria and address microbial constraints, adaptation, and selection under low DO.
- **Aeration System Design:** Selecting and sizing aeration equipment to maintain the optimal low DO levels for energy efficiency and process performance.
- **Instrumentation and Control Strategies:** Implementation of advanced monitoring tools and control systems to precisely regulate DO levels and optimize system performance.
- **Process Modeling:** Discussion on the latest process developments and modeling approaches to simulate low DO BNR systems.
- **Case Studies and Best Practices:** Examples of successful design projects, highlighting real-world applications and challenges encountered when designing for low DO BNR.

Following these presentations, a moderated panel discussion will provide deeper exploration of the themes presented, with experts engaging in a dynamic conversation about design strategies, operational challenges, and future directions for low DO BNR. This interactive segment will provide attendees with an opportunity to ask questions and gain further insights from leading professionals in the field.

Post-Conference Tour
Additional Fees Apply

Tour: Commercial-Scale Pyrolysis Demonstration at the Synagro Drying Facility in collocated at the City of Baltimore Back River WWTP
Friday, May 9, 2025
12:15 PM – 2:30 PM

Visitors will receive an overview and tour of a commercial-scale short-term demonstration of biosolids pyrolysis that is currently being constructed and will be operating at the Synagro Drying Facility at the City of Baltimore Back River WWTP, Maryland. The pyrolysis process is designed and supplied by CHAR Technologies, of Toronto, CA. Pyrolysis thermally decomposes biosolids pellets in the absence of oxygen. This pyrolysis process occurs within a rotary kiln chamber with an external burner that after starting up with propane, burns the Syngas generated during the pyrolysis process.

Synagro on behalf of the City of Baltimore designed, built and operates a Seghers Pelletech Indirect Tray Dryer at the Back River WWTP. The dryer produces biosolids pellets at about 90% solids. The Char Technologies pyrolysis demonstration unit will convert over 8 tons per day of dried biosolids pellets to biochar and is projected to produce high heating value Syngas containing dust, steam, hydrogen, carbon monoxide, carbon dioxide and methane. The Pyrolysis Demonstration Unit includes Syngas scrubbers that convert the Syngas for internal use in the pyrolysis unit.

This six-month demonstration, scheduled from January 2025 to July 2025, aims to provide valuable insights into the operational sustainability and environmental benefits of pyrolysis in biosolids management, including:

a. Verification of PFAS (synthetic, per- and polyfluoroalkyl substances) characteristics of the biosolids, the Syngas and the Biochar confirming the anticipated PFAS removal in the pyrolysis process.
b. Demonstration of the viability of converting biosolids pellets into valuable by-products: syngas for potential energy recovery and biochar for agricultural or environmental applications.
c. Verification of the performance of the pyrolysis process on biosolids continuously for at least six months.
d. Verification of the resultant Syngas characteristics, and the opportunities and requirements for reusing within the dryer system or upgrading to renewable energy.
e. Verification of the resultant Biochar characteristics, and suitability for its use as a soil amendment.

Technology Spotlight I
Wednesday, May 7
12:40 p.m. – 1:25 p.m.

The three exhibitors listed below will hold a 20-minute presentation twice each. Participants are invited to attend a different presentation at each of the times listed below. Choose the presentation you would like to attend. Each presentation happens at the exhibitor's booth. Presentations kick off concurrently at: ***12:45 p.m.*** *in each of the three booths.*

12:40 p.m.	Technology Spotlight Introduction at entrance to exhibit hall
12:45 p.m.	3 Simultaneous Presentation A
1:05 p.m.	3 Simultaneous Presentation B

Booth 2014 **Live Demonstration of Liquid Turning Supercritical**
Naomi Senehi, Sudhakar Viswanathan, 374Water Inc.

Booth 2118 **Biosolids Biochar – The Australian Experience with Commercial Production and Value Realisation**
Deric Dignon, Pyrocal

Booth 2214 **Transforming Biosolids Management: Energy Recovery & Waste Elimination Through Gasification**
Shyla Lindner, Aries Clean Technologies

Technology Spotlight II
Wednesday, May 7
3:15 p.m. – 3:40 p.m.

The two exhibitors listed below will each hold a 20-minute presentation once each. Participants are invited to attend a different presentation at each of the times listed below. Choose the presentation you would like to attend. Each presentation happens at the exhibitor's booth. Presentations kick off concurrently at: ***3:20 p.m.*** *in each of the two booths.*

3:15 p.m.	Technology Spotlight Introduction at entrance to exhibit hall
3:20 p.m.	2 Simultaneous Presentation A

Booth 1807 **Maximizing the Efficiency of Dewatered Biosolids Transport: Discover an innovative approach that combines pneumatic dense-phase conveying with progressive cavity pumping**
Westyn Bennington, SEEPEX

Booth 1907 **Using Computational Fluid Dynamics (CFD) in the Design of Mixing Solutions**
Erik Larson, Vaughan Company

Technology Spotlight III
Thursday, May 8
10:15 a.m. - 10:40 a.m.

The two exhibitors listed below will each hold a 20-minute presentation once each. Participants are invited to attend a different presentation at each of the times listed below. Choose the presentation you would like to attend. Each presentation happens at the exhibitor's booth. Presentations kick off concurrently at: ***10:20 a.m.*** *in each of the two booths.*

10:15 a.m. Technology Spotlight Introduction at entrance to exhibit hall
10:20 a.m. 2 Simultaneous Presentation A

Booth 1714 **Performic Acid (PFA) Onsite Generator (DEX unit) and Online Detection of Residual PFA**
Iris Porat, Kemira Water Solutions

Booth TBD **Sidestream ammonia recovery for digestion intensification: electrochemical ammonia stripping for decreased footprint and chemical feedstocks**
Kindle Williams, Stanford University

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Residuals & Biosolids Program
Sessions 01 - 27

Jump To:

Opening General Session
Wednesday, May 7, 2025
8:30 AM – 10:00 AM

Attendees from the Innovations in Treatment Technology track and the Residuals and Biosolids track will come together for an engaging and energizing opening session. More information and a full agenda for this session is coming soon.

RB Session 01: Water Research Foundation Projects to Understand PFAS Management in Biosolids

Wednesday, May 7, 2025
10:45 AM - 11:45 AM

Speakers: Patrick McNamara, Marquette University; Lloyd Winchell, Brown and Caldwell; Mohammad Abu-Orf, Hazen and Sawyer; Mahsa Modiri Gharehveran, EA Engineering; Lynne Moss, Black & Veatch

Per- and Polyfluoroalkyl Substances (PFAS) have dramatically shifted the biosolids management landscape, with one state already passing a ban on land application due to PFAS in biosolids. Thus, there is a great research need to understand the regulatory status, management options, and technology impacts on the fate of PFAS in biosolids. Therefore, the Water Research Foundation (WRF) has supported this important research need. This session will highlight findings from four WRF projects that focus on PFAS in biosolids

RB Session 02: Academic Advancements in Digestion and Fugitive Greenhouse Gas Emissions

Wednesday, May 7, 2025
10:45 AM - 11:45 AM

10:45 AM **Not Every Utility is Equal: How Operational Patterns, Influent Characteristics, and Compliance Limits Shape Fugitive GHG Emission Variability in Wastewater Treatment Plants**
Ahmed Alsayed, Northwestern University; Ahmed Elsayed, Toronto Metropolitan University; Mostafa Khalil, modelEAU, Laval University; Mohamed Zaghloul, Toronto Metropolitan University; Farokh Laqa Kakar; Katherine Bell, John Willis, Brown and Caldwell; Elsayed Elbeshbishy, Toronto Metropolitan University

11:05 AM **Long-Term Effects of Cycle Time and Volume Exchange Ratio On Poly(3-Hydroxybutyrate-Co-3-Hydroxyvalerate) Production from Food Waste Digestate by Haloferax Mediterranei Cultivated in Sequencing Batch Reactors**
Xueyao Zhang, Virginia Tech; Zhaohui An; Jiefu Wang, Virginia Tech; Stephanie Lansing, University of Maryland; Naresh Kumar Amradi; Md Sazzadul Haque; Zhiwu Wang, Virginia Tech

11:25 AM **Rumen-Inspired Anaerobic Dynamic Membrane Bioreactor Enhances Hydrolysis in Food Waste and Sludge Digestion**
Renisha Karki, University of Michigan; Narasimman Lakshminarasimman; Renata Starostka, Pedro Puente, Timothy Fairley-Wax, Kuang Zhu, Steven Skerlos, Lutgarde Raskin, University of Michigan

Alternate **Enhancing Anaerobic Digestion of Sewage Sludge Through Strategic Bioaugmentation with Optimized Microbial Consortia**
Abir Hamze, Toronto Metropolitan University (TMU); Basem Zakaria, University of Alberta; Mohamed Zaghloul, Toronto Metropolitan University; Andreas Ganatsios, Hydrotech Environmental L.P; Dimitrios Chrysochoou, TraderWorks Environmental Inc; Bipro Dhar, University of Alberta; Elsayed Elbeshbishy, Toronto Metropolitan University

11:45 AM **Session Adjourns for Networking Luncheon**

RB Session 03: Exploring Pathways to Dried Biosolids
Wednesday, May 7, 2025
10:45 AM - 11:45 AM

10:45 AM **Transforming THP Cake into Soil and Halving the Tonnage Using the New Dune Process**
Todd Williams, Bart Kraakman, Zac Alexander, Jacobs

11:05 AM **Evaluating Sludge Drying Reed Beds as a Nature Based Solution for Biosolid Management in Wastewater Treatment Facilities**
Thomas Drummond, Adrian O'Connor, AECOM; Dara White, Uisce Eireann (formerly Irish Water)

11:25 AM **Successful Commissioning and Operation of a New Regional Biosolids Drying Facility**
Nelson Heringer, Adam Parmenter, HDR; David Cox, City of Hickory

Alternate **Low Temperature Conductive Drying: Enhancing Thermal Efficiency in Biosolids Treatment**
Jon Orr, Heartland

11:45 AM **Session Adjourns for Networking Luncheon**

RB Session 04: Practical Considerations in Digestion
Wednesday, May 7, 2025
10:45 AM - 11:45 AM

10:45 AM **Are Your Digesters Up to the Job? Aligning Resource Recovery Planning with Reality**
Natalie Sierra, Christopher Muller, Brown and Caldwell

11:05 AM **Beneath the Surface: Comprehensive Condition Assessment Techniques to Fortifying Tankage for the Future**
Abdiel Picazo, Eastern Municipal Water District; Sean Hoss, Brad Stuart, HDR

11:25 AM **The Struvite Scourge: Practical Operations & Maintenance Considerations for Handling Nuisance Struvite Formation**
Dustin Craig, CDM Smith

Alternate **Increasing Biomethane Potential of Various Organic Wastes with a Low Temperature Thermal Chemical Hydrolysis Process**
Ajay Singh, Kelly Ward, Alex West, Mike Beswick, James Dunbar, Lystek; Basem Haroun, George Nakhla, Western University; Mike Muffels, PlanET Biogas Solutions

11:45 AM **Session Adjourns for Networking Luncheon**

RB Session 05: Considerations for Long-Term Biosolids Planning
Wednesday, May 7, 2025
1:30 PM - 3:00 PM

1:30 PM **Not all Master Plans are the Same: Understanding Local Drivers to Develop a Unique and Dynamic Roadmap**
Tracy Chouinard, Tom Schwartz, Brown and Caldwell

1:50 PM **A Road Map for Navigating Biosolids Disposal Challenges at SESD Through Application of Existing and Emerging Technologies**
Nick Avila, C. Goss Jr., Matthew Ribeiro, AECOM; Mike Wilson, Peter Pommersheim, South Essex Sewerage District

2:10 PM **Addressing Practical Barriers to Large-Scale Co-Digestion to Improve Feasibility**
Rashi Gupta, Carollo Engineers

2:30 PM **WRF#5169 Evaluating Innovative and Sustainable Treatment Options for Biosolids**
Micah Blate, Mohammad Abu-Orf, Paul Knowles, Anne Sun, Asa lewis, Hazen and Sawyer

2:50 PM **Discussion**

Alternate **Evaluating Feasibility and Triple Bottomline Benefits of Implementing Co-digestion at San Francisco Airport**
Ganesh Rajagopalan, AECOM; Matthew Higgins, Bucknell University; Michael Hummel, Stok, LLC; John Mahoney, Tanner Pacific; Erin Cooke, Jennifer Acton, San Francisco International Airport

3:00 PM **Session Adjourns for Networking Break**

RB Session 06: Utility Experience Using Incineration as a Proven Solids Management Technology

Wednesday, May 7, 2025
1:30 PM - 4:45 PM

Speakers: Marcel Pomerleau, EnviroCare International; Webster Hoener, Black & Veatch; John Yu, Chavond-Barry Engineering; Lloyd Winchell, Persephone Ma, Brown and Caldwell; Mike Hilton, Plantwide IC; Stephen Norton, MCES; Nicholas Merchant-Wells, Northeast Ohio Regional Sewer District; Jason David, Region of Peel; Gwenyth Jordan, Veolia

Incineration is a WEF supported, proven, and valuable technology option for wastewater agencies to meet their biosolids processing goals. This workshop is designed to allow municipal wastewater treatment plant owners, operators, managers, and industry subject matter experts to network and learn about best practices and emerging trends in sewage sludge incineration (SSI). This includes beneficial use examples of incineration ash. With a decade having passed since the implementation of the MACT 129 emission regulations, many site-specific practices have been successfully established. New concerns, particularly regarding PFAS in residuals and biosolids, have brought incineration back into focus as a proven solution. The workshop will be an important opportunity to educate a new generation of industry professionals on the successful history and future promise of incineration technologies as a robust option for sludge disposal. This workshop will offer an interactive platform for participants to share experiences, discuss current needs, and explore strategies for optimizing the numerous biosolids incineration systems operating across North America. Presentations will feature some of the largest wastewater agencies in North America speaking about their experiences with Multiple Hearth Furnace and Fluidized Bed Incineration technology. Wastewater agency consultants and subject matter experts will present on case studies and capital project implementation highlighting important topics like funding, permitting, and meeting the worlds most stringent emission regulations. There will also be an update to WRF project #5111 on data for PFAS destruction in these technologies.

RB Session 07: Case Studies for Optimizing THP, Dewatering, and Digestion
Wednesday, May 7, 2025
1:30 PM - 4:45 PM

1:30 PM **Seeding, Startup, and Commissioning of Three THP Systems at Various WRRFs**
Laurel Schaich, Daniel Bond, CDM Smith; Seyed Mohsen Sadatiyan Abkenar

1:50 PM **Enhancing Biosolids Management with THP: From Startup to Optimization and Troubleshooting at HRSD's Atlantic Treatment Plant**
Dana Gonzalez, Carollo Engineers; Holly Anne Matel, Barbara Ward, Jeffrey Nicholson, Christopher Wilson, Charles Bott, Hampton Roads Sanitation District (HRSD)

2:10 PM **A Week Becomes a Day: New Ideas and O&M Collaboration Leads to the Shortest THP Shutdown on Record**
Stephanie Spalding, HDR; Shane Dearborn, Dylan Woolard, David Ewing, Jeffrey Powell, Hampton Roads Sanitation District

2:30 PM **Piscataway WRRF Bioenergy Project - Owner and PDB Collaborative Sampling during Startup and the Transition into Operational Sampling**
Eric Krentel, HDR; William Mapes, WSSC Water

2:50 PM **Discussion**

3:00 PM **Networking Break**

3:45 PM **HRSD's ROCI Project: Identifying and Fast-Tracking Improvements to Meet Solids Process Reliability and Community Needs**
Lynne Moss, Black & Veatch; Holly Anne Matel, Hampton Roads Sanitation District (HRSD); Engin Guven, Black & Veatch

4:05 PM **Centrifuge Operational Adjustments Result in Cost Saving Opportunities at NEORSD**
Adam Parmenter, HDR; Nicholas Merchant-Wells, Northeast Ohio Regional Sewer District

4:25 PM **I Spy Fugitive Methane: A Look at 3-years of Leak Detection Surveys**
Trung Le, Brown and Caldwell

Alternate **Forecasting Volatile Solids Reduction of Municipal Sludge Using 32 Years of Data**
Antoine Picard, Antoine Picard, Danielle Trap, SUEZ; Damien Batstone, University of Queensland; Roman Moscoviz, Mathieu Haddad, SUEZ

4:45 PM **Session Adjourns for Networking Reception**

RB Session 08: Fugitive Methane Investigation and Abatement
Wednesday, May 7, 2025
1:30 PM - 4:45 PM

Speakers: William Brower, Dante Fiorino, Brown and Caldwell; David Ponder; Elsayed Elbeshbishy, Toronto Metropolitan University; Zhiyong Ren, Princeton University Library Serials Division; Geoffrey Schweinfurth, City of Columbus Department of Public Utilities; Jeff Prevatt, Pima County

1:30 PM **Introduction, Drivers, and Regulations State of Fugitive Methane**
Bill Brower, Brown and Caldwell

1:50 PM **NSERC: Integrating Multi-Scale Observations with Wastewater Process Simulations for Measuring, Monitoring, and Modelling GHG Emissions in Canadian Sewers and WRRFs**
Dr. Elsayed Elbeshbishy, University of Toronto

2:10 PM **Emerging and Available Quantification Technologies**
Dr. Jason Ren, Princeton University

2:30 PM **Practical Case Study Pt 1 Fugitive Methane Quantification and Source Identification**
Alex Fuentes, WSSC Water

3:00 PM **Netowrking Break**

3:45 PM **Practical Case Study Pt 2 Whole Utility Approach to Reducing Climate Impact**
Tyler Schweinfurth, City of Columbus; Dante Fiorino, Brown and Caldwell

4:05 PM **Practical Case Study Pt 3**
Jeff Prevatt, Pima County

4:25 PM **Panel Discussion**
Moderator: David Ponder, US Water Alliance

4:45 PM **Session Adjourns for Networking Reception**

RB Session 09: PFAS Equity: Coalition Efforts to Ensure Polluters Pays; Ratepayers Protected
Wednesday, May 7, 2025
3:45 PM - 4:45 PM

Speakers: Layne Baroldi, Kip Cleverley, Synagro Technologies, Inc.; Eric Sapirstein, ENS Resources, Inc.; James Slaughter, Beveridge & Diamond, P.C.

This WEF Session will provide an update on the Coalition's legislative, regulatory, legal and outreach efforts to protect the industry as an essential public service from unjustifiable liability. Future action items include a specific provision to ensure that the organizations we represent are explicitly recognized as 'passive receivers' of PFAS and afford these essential public services a narrow exemption from CERCLA liability. Absent such relief, designation of certain PFAS as CERCLA hazardous substances would shift the 'polluter pays' principle of the law to that of a 'community pays' model, placing the unjustified burden of compliance and cleanup onto ratepayers and the public at-large.

RB Session 10: Innovations in Sludge Management: Enhancing Anaerobic Digestion and Phosphorus Control
Thursday, May 8, 2025
8:30 AM - 11:45 AM

8:30 AM **Pima's Plural Purposes for PONDUS**
Adam Parmenter, HDR; Jeff Prevatt, Pima County

8:50 AM **2nd Generation THP – Intermediate THP at a Large WWTW**
Ester Rus, Davy Ringoot, Cambi

9:10 AM **IntensiCarb® for Anaerobic Digestion Intensification: A Techno-economic Analysis**
Alexander Seidel, Maxwell Armenta, Brown and Caldwell; Farokh Laqa Kakar; Ahmed Al-Omari, Brown and Caldwell; Ali Khadir, Western University; Chris Sheculski, Trojan Technologies; Domenico Santoro, USP Technologies; Katie Bell; Chris Muller, Brown and Caldwell

9:30 AM **Enhancing Anaerobic Digestion with MHP**
Madeleine Fairley-Wax, Stephanie Cope, David Parry, Jacobs

9:50 AM **Discussion**

10:00 AM **Networking Break**

10:45 AM **Post-AD-THP and Effect on Dewaterability and Formation of Refractory Compounds**
Anne Helene Sandsmark, Anne-Line Bakke, Alexandru Botan, Hans Rasmus Holte, Andreas Lilleboe, Cambi

11:05 AM **Phosphorus Sequestration in Biosolids, Nuisance Struvite Control via PAD and Chemical Addition to TH-AD Solids**
Caitlyn Harris, HRSD; Dana Gonzalez, Carollo; Arba Williamson, Jeffrey Nicholson, BJ Ward, Holly Anne Matel, Charles Bott, Christopher Wilson, Hampton Roads Sanitation District (HRSD)

11:25 AM **Full-Scale Implementation of Coagulant Dosing for Recalcitrant Nitrogen and Orthophosphate Control During Dewatering of Thermal Hydrolysis Pretreatment-Enhanced Anaerobic Digester Sludge**
Yitao Li, Virginia Tech; Malcolm Taylor, Caroline Nguyen, WSSC Water; John Novak, Zhiwu Wang, Virginia Tech

Alternate **Sustainable Sludge Management by Controlling Microbial Population Dynamics**
Rob Whiteman, ABS Inc.

11:45 AM **Session Adjourns for Networking Luncheon**

RB Session 11: Drones, Satelites, Sensors, Oh My!: Advances in Fugitive Methane Monitoring
Thursday, May 8, 2025
8:30 AM - 10:00 AM

8:30 AM **State of Fugitive Methane Regulations and Monitoring Efforts in the United States**
Jennifer Border, Trung Le, Brown and Caldwell

8:50 AM **Drone-Based Imaging and Sensing: Quantification of Fugitive Methane Emissions from Full-Scale Wastewater Treatment Facility**
Omar Abdelrahman, Ahmed Elsayed, Toronto Metropolitan University; Ahmed Alsayed, Northwestern University; Mostafa Khalil, modelEAU, Laval University; Mohamed Zaghloul, Toronto Metropolitan University; Farokh Laqa Kakar; Katherine Bell, Trung Le, Brown and Caldwell; John Willis, John Willis Company; Elsayed Elbeshbishy, Toronto Metropolitan University

9:10 AM **Use of Satellite Imagery for Characterizing the Temporal Dynamics of Fugitive Methane Emissions from Biosolids Treatment Processes**
Ke Du, Seyed Mostafa Mehrdad, University of Calgary; Bo Zhang, Stantec

9:30 AM **Continuous Monitoring of Fugitive Methane in Wastewater Treatment Plants Using Ground Sensors**
Ahmed Elsayed, Toronto Metropolitan University; Ahmed Alsayed, Northwestern; Omar Abdelrahman, Toronto Metropolitan University; Mostafa Khalil, modelEAU, Laval University; Mohamed Zaghloul, Toronto Metropolitan University; Farokh Laqa Kakar; Katherine Bell, Trung Le, John Willis, Brown and Caldwell; Elsayed Elbeshbishy, Toronto Metropolitan University

9:50 AM **Discussion**

Alternate **The Carbon Footprint of Producing Biogas and Biomethane from Municipal Sludge Digestion**
William Barber, Cambi

10:00 AM **Session Adjourns for Networking Break**

RB Session 12: Understanding EPA's Risk Assessment Process and Its Impact on Biosolids Regulations

Thursday, May 8, 2025
8:30 AM - 11:45 AM

Speakers: Natalie Sierra, Brown and Caldwell; Greg Kester, California Association Of Sanitation Agencies; Chris Peot, DC Water & Sewer Authority; David Tobias, US EPA; Drew McAvoy, University of Cincinnati

Per-and polyfluoroalkyl substances (PFAS) have received considerable public attention in recent years. The potential for biosolids to release PFAS to the environment led EPA to include risk assessments for land applied and incinerated biosolids in its overall PFAS roadmap. EPA's risk assessment work on PFOS and PFOA (anticipated to be released by December 2024) has the potential to represent the first significant change to the regulatory framework under which biosolids programs have operated since the promulgation of Chapter 40, Part 503 of the Code of Federal Regulations (40 CFR 503) over 30 years ago. This session aims to provide attendees with fundamental knowledge about how risk assessments have been used over time to develop the regulatory framework around biosolids management. Attendees will be exposed to general risk assessment principles and how these have been applied to develop 40 CFR 503, including EPA's most recent work on PFOS and PFOA. The proposed session is structured to help attendees understand what EPA's updated risk assessment framework means for future regulations, including how updated assumptions and inputs have informed EPA's risk assessment for PFOS and PFOA. As the risk assessment for PFOS and PFOA is expected to be released by December 2024, this session will serve as a timely deep dive into the topic. A diverse array of speakers will provide unique perspectives, including both regulators and representatives of the regulated community.

RB Session 13: Some Like It Hot - Diving into Incineration, Pyrolysis, and Gasification

Thursday, May 8, 2025
8:30 AM - 11:45 AM

8:30 AM **Comparative Analysis of Mass and Energy Balances in Incineration, Anaerobic Digestion, THP, Drying, Pyrolysis, and Gasification Processes for Municipal Biosolids Treatment**
Karthik Manchala, GHD

8:50 AM **A Holistic Life Cycle Assessment: Rethinking The Impact of PFAS Emissions in Biosolids Thermal Processes**
Leah Pifer, Francesca Cecconi, Andrew Shaw, Webster Hoener, Black & Veatch; Patrick McNamara, Marquette University; Lynne Moss, Black & Veatch

9:10 AM **Achieving Carbon Neutrality at the Largest Fluidized Bed Biosolids Gasification Facility in the World**
Steven Lobo, Ilke Erdogan, Amir Alansari, Stantec; Joel Thornton, Aries Clean Technologies

9:30 AM **Evaluation of Sewage Sludge for Autothermal Pyrolysis Prior, to Pilot Test.**
Philip Pedros; Tannon Daugaard, Iowa State University; Sean McKelvey, Mekhana Scaria, Philadelphia Water Department

9:50 AM **Discussion**

10:00 AM **Networking Break**

10:45 AM **Siloxanes in Producer Gas from Pyrolysis of Sewage Sludge, Operational Problems and a Solution**
Philip Pedros; Ulrich Knoerle, Eliquo Technologies; Ankit Kukreja, Dürr Systems, Inc.

11:05 AM **Commercial-Scale Pyrolysis Demonstration for PFAS Destruction, Syngas Recovery, and Biochar Production at the Synagro Drying Facility, City of Baltimore Back River WWTP**
Donald Song, Synagro; Mahmudul Hasan, Baltimore City Department of Public Works

11:25 AM **Biosolids Incineration in the Times of PFAS**
Peter Burrowes, Todd Williams, Gokul Bharambe, Ohis Ahanmisi, Jacobs

Alternate **Is Biosolids Gasification and Pyrolysis Living up to the Hype?**
C. Goss Jr., AECOM

11:45 AM **Session Adjourns for Networking Luncheon**

RB Session 14: Optimizing Resource Recovery: Biogas and Nutrient Reuse
Thursday, May 8, 2025
10:45 AM - 11:45 AM

10:45 AM **Aligning Cogeneration Sizing With Everyone's Goals (Big WRRF Edition)**
Christian Chiodo, Brown and Caldwell

11:05 AM **A Sustainable Biogas and Hydrogen LOOP**
Amanda Lake, Jacobs; Suzy Hill, United Utilities; Rebecca Haylock, Jacobs; Richard Clarke, United Utilities; MIke Lloyd, Levidian; Lisa Mansell, United Utilities

11:25 AM **Refining Phosphorus Recovery: Practical Improvements for Water Resource Recovery Facilities**
Rudy Maltos, Daniel Freedman, Liam Cavanaugh, Tanja Rauch-Williams, Metro Water Recovery; Rylee Rubino

Alternate **Advancing Ammonia Recovery for Sustainable Nutrient Reuse: Intensified Anaerobic Digestion with IntensiCarbTM (IC)**
Ali Khadir, Western University; Eunkyung Jang, Domenico Santoro, John Walton, USP Technologies; Ahmed Al-Omari, Christopher Muller, Katherine Bell, Brown and Caldwell; Wayne Parker, University of Waterloo; George Nakhla, University of Western Ontario

11:45 AM **Session Adjourns for Networking Luncheon**

RB Session 15: Digestion Process Intensification and Sidestream Management Strategies

Thursday, May 8, 2025
1:30 PM - 4:45 PM

Speakers: Silvia Fuentes, Washington Suburban Sanitation Commission - Laboratory; Jeff Prevatt, Pima County; Daniel Freedman, Metro Water Recovery; Larry Li, Brentwood Industries

Water resource recovery facilities (WRRFs) continue to evaluate alternate treatment options in response to increasing price escalations. Rising capital costs for expanding municipal water resource recovery capacity cannot be underestimated as many utilities are forced to scale back capital improvement programs in response. This trend has resulted in increased interest in alternative process intensification strategies capable of outperforming conventional designs while maximizing existing tank volumes and reducing operational costs. In addition, WRRFs are under pressure to meet increasingly stringent discharge limits for nitrogen and phosphorus as recently reflected in California with the implementation of the third Nutrient Watershed Permit. Quite often, greater economies of scale can be realized by addressing sidestream treatment processes where pollutants tend to be concentrated. Technologies that are typically sought are those capable of providing significant in capital costs savings associated with reductions in concrete tank volume, footprint, etc. In addition to reduced capital costs, preference is often given to technologies that also demonstrate appreciable reductions in operation and maintenance (O&M) costs. Phosphorus sequestration and deammonification are two examples of highly effective sidestream treatment processes. Similarly, the number of thermal hydrolysis processes installations has steadily expanded as WRRFs seek to reduce both sludge and biosolids volume while simultaneously increasing biogas yields. These processes have proven highly effective with a variety of technologies for users to select from. However, when combining technologies, each may not be entirely compatible and can significantly impact one another as well as downstream processes presenting new challenges and opportunities for improvements. User experiences and lessons learned are key metrics for improving performance and avoiding repetitive problems. As WRRFs nationwide seek to address nutrient removal process options, it is incumbent for utilities to fully understand the implementation and interaction of these strategies for optimizing operation in the management of nutrient recycle loads. This workshop serves to highlight the application of digestion enhancement technologies, sidestream nutrient removal technologies, and the interactions and challenges faced when combining intensification processes.

RB Session 16: Navigating Land Based Biosolids Management
Thursday, May 8, 2025
1:30 PM - 3:00 PM

1:30 PM	**Getting a Biosolids Strategy Across the Finish Line: Engaging Elected Officials for Informed Decision-Making** Megan Ross, Kiewit Water Facilities Florida
1:50 PM	**Beneficial Use Dashboard: Biosolids Data Management** Nicole Laurita, City of Englewood, Colorado
2:10 PM	**Regulatory Update: An Analysis of Regulatory Changes and Trends at the Federal and State Level Surrounding PFAS in Biosolids** Nickolas Hines, Material Matters
2:30 PM	**Harvest Time is Here! Biosolids Unspoken Role in Improving Our Declining Soil Health: A Literature Review to Enhance Communication Tools for Biosolids Managers** Ilke Erdogan, Stantec Inc.; Muriel Steele, Charlotte Water; Giovanna Portiolli, City of Charlotte; Joseph Lockler, Charlotte Water
2:50 PM	**Discussion**
Alternate	**Silver Spring Township's Journey to Beneficial Use** Lisa Challenger, Material Matters
3:00 PM	**Session Adjourns for Networking Break**

RB Session 17: Improving Pre-Digestion Hydrolysis (THP)
Thursday, May 8, 2025
1:30 PM - 4:45 PM

Speakers: Tom Nangle, Brown and Caldwell; Raudel Juarez, Trinity River Authority of Texas; Diran Adalian, DC Water & Sewer Authority; Erika Bailey, City of Raleigh; Charles Bott, Hampton Roads Sanitation District (HRSD); Josh Mah, WSSC

WEF's Research and Innovation Community initiated the RISE (Research and Innovation for Strengthening Engagement) program, whose stated goal is to accelerate adoption of innovative technology within the water industry by integrating utilities, academia, and consultants in the discussion. One of these RISE focus groups has been working on 'Improving Pre-Digestion Hydrolysis'. This focus group brought together equipment suppliers, leading researchers in the field from academia, consultants, and most of the North American utilities that have incorporated hydrolysis into their program or are interested in doing so. The goals of this focus group were:

1. Identify questions and challenges that impede wider adoption of pre-digestion hydrolysis processes, and
2. Facilitate further knowledge development and innovative solutions to reduce uncertainty and improve performance of pre-digestion hydrolysis processes.

The group started identifying the main questions, concerns and challenges associated with implementing thermal hydrolysis pretreatment systems through several interactive meetings. These concerns were prioritized and consolidated into the following themes:

- Improve operability and process performance
- End product considerations
- Health and safety (H&S)/staffing considerations

The group is in the process of developing a white paper documenting interviews with utilities that have or are in the process of implementing THP systems. However, a main accomplishment of this group was the network development among utilities and the knowledge sharing and collaborative problem solving for common challenges. The goal of this technical session is to highlight lessons learned and bring the interactive discussions being held in this focus group to the larger WEF community. While the focus group also evaluated the Pondus thermal/chemical hydrolysis system, it's major focus was around Cambi's thermal hydrolysis offerings. Most utilities participating in the focus group had or were pursuing this system, and the Cambi system is more complex and had a lot more questions and room for optimization due to the varying process systems associated with this technology offering. Due to the demand for more information, this session is focusing on the Cambi pre-digestion hydrolysis offering exclusively. Also, as the name suggests, the focus group was tasked with looking at pre-digestion hydrolysis, and therefore ignored the less common Cambi installation configurations and other hydrolysis technology solutions associated with inter or post digestion hydrolysis.

RB Session 18: RBC Young Professional Growth and Development Forum
Thursday, May 8, 2025
1:30 PM - 3:00 PM

Speakers: Alexander Seidel, Brown and Caldwell; Madeleine Fairley-Wax, Jacobs; Bernadette Drouhard, Sarah Guzman, Black & Veatch; Manav Baid, AECOM

Join us for an engaging 2-part session designed specifically for young professionals (YPs) in the biosolids industry! This session offers practical advice and clear next steps for YPs looking to grow their careers and become more engaged in RBC activities.

The session begins with a panel and open Q&A featuring experienced professionals from across the residuals and biosolids industry, including consulting, public utilities, and regulatory agencies. Our panelists will share their own career journeys, lessons learned, and strategies for success. Whether you're navigating early career choices or looking to take the next step, this discussion will provide valuable insights and tips for advancing in the biosolids sector.

Following the panel, RBC Focus Group 101: A Guide to Getting Involved will give YPs the opportunity to meet with leaders from every RBC focus group. Each leader will facilitate small roundtable discussions focusing on the group's mission and work and will provide YPs with concrete ways to increase their engagement.

This session aims to provide a welcoming and inclusive space for YPs to freely ask questions, seek guidance, expand their networks, and develop a clear plan for how to engage with focus groups and make meaningful contributions to the RBC community.

RB Session 19: Optimizing Biogas Production and RNG: Microaeration and Sulfur Management
Thursday, May 8, 2025
3:45 PM - 4:45 PM

3:45 PM **Cleaning up Biogas for Free at Lander Street WRF: New Insights on Microaeration for Anaerobic Digestion**
Adrian Romero, Jacobs Engineering; Kylle Walkoski, City of Boise Public Works Department; Jeff Hodson, Matthew Noesen, William Leaf, Jacobs Engineering

4:05 PM **Digester Microaeration: A Comprehensive Full-Scale Case Study**
Matt Seib, Madison Metropolitan Sewerage District

4:25 PM **Overcoming Sulfur Challenges in the Anaerobic Lagoon Startup in South Sioux City, NE**
Dillon Devitt, Matthew Thompson, HDR

Alternate **Critical Pathways to Success: Developing and Operating Biogas-to-RNG Systems in Water and Resource Recovery Facilities**
Amir Ghasdi, Dilshad Mondegarian, GHD

4:45 PM **Session Adjourns**

RB Session 20: Advances in Process Modeling: Aeration, Scaling, and Anaerobic Digestion Dynamics
Thursday, May 8, 2025
3:45 PM - 4:45 PM

3:45 PM **Comparing Modeling Tools Visual MINTEQ and OLI Studio to Evaluate Scaling Tendency of Aerated Anaerobically Digested Solids: A Pilot Study**
Caitlyn Harris, HRSD; Shubhashini Oza, Christopher Muller, Katherine Bell, Brown and Caldwell; Jeffrey Nicholson, BJ Ward, Holly Anne Matel, Christopher Wilson, HRSD

4:05 PM **Monod Kinetic Parameters Determined for Different Anaerobic Digesters Vary over a Wide Range: Implication for Modelling and Correlation with Microbial Community Data**
Antonio Martins, Mercedes Cruz, Nicholas Benn, Christopher Marshall, Daniel Zitomer, Marquette University

4:25 PM **Modelling the Impact of the Aerobic Sludge Age on Thermally Pretreated Wastewater Biosolids**
Amr Ismail; Elsayed Elbeshbishy, Toronto Metropolitan University; George Nakhla, University of Western Ontario

Alternate **Assessing Modelling Applications for Scale Mitigation and Phosphorus Removal Strategies: Insights from Blue Plains Advanced Wastewater Treatment Plant**
Peibo Guo, Shubhashini Oza, Brown and Caldwell; Yuan Yan; Chris Peot, DC Water; Melissa Bollmeyer, Matthew Reid, April Gu, Cornell University; Haydee De Clippeleir, DC Water

4:45 PM **Session Adjourns**

RB Session 21: Triple Bottom Line of Biosolids Master Planning
Friday, May 9, 2025
8:30 AM - 10:00 AM

8:30 AM **Navigating the PFAS Hype: Biosolids Planning Through the Uncertain Regulatory Climate**
Kwok-Wai Tsang, CDM Smith; Gunner Mitchell, Pinellas County Utilities

8:50 AM **Assessment of Economic, Social and Environmental Benefits (Circularity) of Biosolids Recovery Options at WRRFs: A Screening Tool**
Caroline Samberger, Joseph Jacangelo, Joan Oppenheimer, Stantec

9:10 AM **Financial Fuel: Leveraging the Investment Tax Credit to Fund Columbus™ Bioenergy Project**
DJ Wacker, Brown and Caldwell; Geoffrey Schweinfurth, City of Columbus Department of Public Utilities; Alison Nojima, Dante Fiorino, Brown and Caldwell

9:30 AM **Finding Sustainable, Cost-effective and Practical Solutions for Wastewater Solids Disposal at the City of Rio Rancho Facilities: A Case Study**
Rahul Subramanian, Emma Haskell, Hazen and Sawyer

9:50 AM **Discussion**

Alternate **We're on the Road to Somewhere in Paradise: A Roadmap for Novel and Sustainable Biosolids Management at the Sand Island WWTP, Honolulu, Hawaii**
Shyam Sivaprasad, Stantec; Manuel Moncholi; Yueyun Tse, Stantec; Pooja Sinha; Steven Lobo, Stantec Inc.; Tyler Tsuchida, Jaime Nishikawa, R.M. Towill Corporation; Heather Stephens, Bob Armstrong, Stantec

10:00 AM **Session Adjourns for Networking Break**

RB Session 22: Innovations in Waste-to-Value Technologies: Carbon Management and Resource Recovery
Friday, May 9, 2025
8:30 AM - 10:00 AM

8:30 AM **City of Grand Junction and Mesa County's Collaboration to Compost Biosolids and Food Waste - Pilot and Feasibility Study**
Christine Polo, Carollo Engineers; Ashley Firl, Persigo WWTP; Jennifer Richardson, Mesa County Landfill; Leanne Hyatt, Carollo Engineers; Sophie Woods

8:50 AM **A Techno-Economic Analysis on Water Resource Recovery Facilities Employing Carbon Capture Strategies in Biogas Upgrading Practices**
Peibo Guo, Alison Nojima, Trung Le, Alexis Valenti, Adam Ross, Brown and Caldwell

9:10 AM **To Digest or Not to Digest – An Updated Evaluation of an Age-old Question of Carbon Management in Water Resource Recovery Facilities**
Greg Knight, Dylan Christenson, Russell Tate, Kamyar Sardari, Rachel Swezy, Garver

9:30 AM **Fermenting Organic Wastes to Produce Volatile Fatty Acids (VFAs) as a Carbon Sources or Alternate High Value Product**
David Cham, Denny Halim, Maedeh Soleimanifar, Krishnamurthy Ramalingam, The City College of New York; Eugenio Giraldo, Carbon Materials LLC; Natalia Perez, NYCDEP; John Fillos, City College

9:50 AM **Discussion**

10:00 AM **Session Adjourns for Networking Break**

RB Session 23: Advancements in Thickening Technologies: Operational Optimization and Cost Savings
Friday, May 9, 2025
8:30 AM - 10:00 AM

8:30 AM **Thickening Impacts and Optimization when Transitioning to BNR – Salt Lake Case Study**
C. Goss Jr., Grant Davies, AECOM; Jose Rubalcaba, Salt Lake City Corp

8:50 AM **DAFT Optimization - Successes and Challenges of Operating DAFTs without Polymer**
Brianna Miller, Michael Muro, Mason Manross, South Platte Renew

9:10 AM **Advanced Thickening Upgrades: Maximizing Existing Assets by Integration of New Technology**
Jeffrey Zahller, Oskar Agustsson, Patrick Roe, HDR; Kip Summers, Tyle Zuchowski, LOTT Clean Water Alliance

9:30 AM **Thickening through Suspended Air Application Aims to Reduce Energy Consumption**
Derya Dursun, Onder Caliskaner, Yuanbin Wu, Caliskaner Water Technologies

9:50 AM **Discussion**

10:00 AM **Session Adjourns for Networking Break**

RB Session 24: Quantifying your WRRF's Greenhouse Gas Emissions - From Desktop Inventories to Direct Measurement

Friday, May 9, 2025
8:30 AM - 11:45 AM

Speakers: Christine Polo, Jeffrey Paley, Samuel Reifsnyder, Carollo; Jason Ching, Dublin San Ramon Services District; Madeleine Harris, Eagle River Water & Sanitation District; Janine Burke-Wells, North East Biosolids & Residuals Association; Amanda Lake, Jacobs

Wastewater utilities have a significant role to play in mitigating climate change by cutting their greenhouse gas (GHG) emissions. This 2.5-hr session will cover GHG emissions assessments, from baseline inventories to direct real-time monitoring of GHG emissions. This session is targeted to any wastewater utilities interested in quantifying and reducing their GHG emissions and the consultants, manufacturers, and academics interested in supporting that mission. Through a series of case studies and interactive exercises, attendees will learn about several tools available for desktop inventorying and direct measurement of GHG emissions, as well as about the most impactful measures utilities can take to reduce their emissions.

RB Session 25: Advanced Thermal Processes for Sustainable Biosolids Management: Case Studies and Innovations
Friday, May 9, 2025
10:15 AM - 11:45 AM

10:15 AM **SCWO for Orlando: A Case Study on Commissioning Supercritical Water Oxidation for the Treatment of Biosolids to Eliminate PFAS and Reduce Reliance on Biosolids Land Application**
Naomi Senehi, Sudhakar Viswanathan, 374Water Inc.; Alan Oyler, The City of Orlando

10:35 AM **Innovation and Business Case for Hydrothermal Liquefaction as a Solids Management Solution**
Lillian Zaremba, Marie Taponat, David Blair, Zeno Farinelli, Metro Vancouver; Lucy Cotter, Derek Lycke, Ruth Roxburgh, Jacobs

10:55 AM **Feasibility Study for the Implementation of Hydrothermal Liquefaction in Southeast Michigan: Considering Environmental, Economic, and Social Aspects**
Xavier Fonoll Almansa, The University of Texas at Austin; John Norton, Great Lakes Water Authority; John Willis, Brown and Caldwell; Shuyun Li, Yuan Jiang, Timothy Seiple, Pacific Northwest National Laboratory; Andrew Marcus, Great Lakes Water Authority; William Wehner, University of Texas At Austin; Yongli Wager, Mahmood Ataya, Wayne State University

11:15 AM **Fate and Partitioning of Contaminants of Emerging Concern (CECs) during Hydrothermal Liquefaction (HTL) of Wastewater Sludge**
Tim Abbott; Jesse Yuzik, Mohammad Islam, UBC; Paul Kadota, David Blair, Metro Vancouver; Cigdem Eskicioglu, University of British Columbia

Alternate **Thinking 'Outside the Box' to Implement Advanced Biosolids Technologies**
Amy Hanna, Matt Van Horne, Hazen and Sawyer

11:45 AM **Conference Adjourns**

RB Session 26: Advancing Biogas and RNG: Innovations and Regulatory Challenges
Friday, May 9, 2025
10:15 AM - 11:45 AM

10:15 AM **Alternative Approach to Accelerate Beneficial Biogas Utilization and RNG Production**
Giovanna Portiolli, City of Charlotte; Laurel Schaich, Jonathan Lapsley, CDM Smith

10:35 AM **Grappling with the Biogas Regulatory Reform Rule: How RNG Projects are Responding to the Recent Shake Up from the EPA**
Eric Auerbach, Nick Taylor, Shayla Allen, Arcadis; Lauren Whittaker, City of Mesa Office of Sustainability

10:55 AM **Next Evolution of Biogas Upgrading RNG System with Heat Recovery**
Becky Luna, Darrell Buhman, Tyler Dougherty, Carollo; Daniel Freedman, A.D. Norford, Metro Water Recovery

11:15 AM **Biogas/RNG Project Lifecycle**
John Maley; Brian Bakke, HDR

11:45 AM **Conference Adjourns**

RB Session 27: Polymer Optimization: How to Get the Most Bang for your Buck
Friday, May 9, 2025
10:15 AM - 11:45 PM

10:15 AM **From Data to Discovery: Machine Learning in Polymer Optimization**
Joshua Registe, John Rickermann, Nick Pfister, John Myers, Heidi Bauer, Jacobs Engineering

10:35 AM **Multifaceted approach for optimizing polymer demand for belt filter press dewatering**
Haydee De Clippeleir, Khoa Nam Ngo, Tu Duong, DC Water; Parnia Behbahani, Arash Massoudieh, Catholic University; Jeffrey Proctor, John McKinley, Jun Fang, Shawna Martinelli, Nicholas Passarelli, DC Water

10:55 AM **Unveiling the Science of Polymer Activation: Exploring the Benefits through Applications**
Patrick Gallagher, Cleanwater

11:15 AM **Improving Polymer Demand and Filtrate Quality through Use of Diluted Polymer for Final Dewatering**
Khoa Nam Ngo, DC Water; Parnia Behbahani, Catholic University; Tu Duong, DC Water; Arash Massoudieh, Catholic University of America; Jeffrey Proctor, John McKinley, Diran Adalian, Jun Fang, Shawna Martinelli, Nicholas Passarelli, Haydee De Clippeleir, DC Water

11:45 PM **Conference Adjourns**

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Innovations in Treatment Technology Program

Sessions 01-27

Jump To:

Opening General Session
Wednesday, May 7, 2025
8:30 AM – 10:00 AM

Attendees from the Innovations in Treatment Technology track and the Residuals and Biosolids track will come together for an engaging and energizing opening session. More information and a full agenda for this session is coming soon.

ITT Session 01: Young Professional Session
Wednesday, May 7, 2025
10:45 AM - 12:15 PM

This session is being developed by young professionals working on innovations in treatment technology. More information and a full agenda and speaker list are coming soon.

ITT Session 02: Nitrogen Removal Dynamics with Stored Carbon
Wednesday, May 7, 2025
10:45 AM - 12:15 PM

10:45 AM **Deciphering the Role of PHA and Glycogen in Internally Stored Carbon Post-Denitrification Across Three WRRFs**
Riley Doyle, Alexandria Gagnon, Hampton Roads Sanitation District (HRSD); Erik Coats; Peter Vanrolleghem, Université Laval; Charles Bott, Hampton Roads Sanitation District (HRSD)

11:00 AM **Nitrous Oxide Dynamics and Carbon Dosing Optimization in Low Dissolved Oxygen Biological Nutrient Removal**
Bishav Bhattarai, Leah Pifer, Fabrizio Sabba, Prachi Salekar, Leon Downing, Black & Veatch

11:15 AM **What Have We Learned About Low DO Operation? Nitrifiers Adapt, PAOs Thrive, and SND is Not Guaranteed**
Lilian McIntosh, Kester McCullough, Haley Morgan, Alexandria Gagnon, Stephanie Klaus, Hampton Roads Sanitation District (HRSD); Peter Vanrolleghem, Université Laval; Charles Bott, Hampton Roads Sanitation District (HRSD)

11:30 AM **Low Nitrous Oxide Water Resource Recovery Facilities - Tales From Two United Kingdom Water Industry Projects**
Amanda Lake, Jacobs; Andres Nemeth, OxyMem; Giulia Pizzagalli, Anglian Water Services; Blessing Mobolaji, Boyang Wang, Cranfield University; Ajay Nair, Microvi; Aderlanio Cardoso, Peter Vale, Severn Trent Plc; Ana Soares, Cranfield University

11:45 AM **Facilitated Discussion**

12:15 PM **Session Adjourns for Networking Luncheon**

ITT Session 03: Monitoring and Modeling of N2O
Wednesday, May 7, 2025
10:45 AM - 12:15 PM

10:45 AM **Nitrous Oxide Emissions Monitoring Experience at the Los Angeles County Sanitation Districts**
Ruth Spierling, Adam Horn, Raymond Tsai, Ariana Coracero, Los Angeles County Sanitation Districts; Matt Robinette, Los Angeles County Sanitation Districts; Rachel Deco, LA County Sanitation District; Alisha Ly, Los Angeles County Sanitation Districts; Philip Ackman, LA County Sanitation District; Bruce Mansell, Los Angeles County Sanitation Districts

11:00 AM **Two Birds, One Test: Off-gas Testing for Assessing Scope 1 and Scope 2 Emissions**
Samuel Reifsnyder, Greg Stanczak, Maya Pruett, Jorge Zambrano, Samarth Suresh, Michelle Young, Malachai Woodiwiss, Jess Brown, Carollo Engineers

11:15 AM **Hybrid Modeling and Diagnosis to Reduce Nitrous Oxide Emissions at Water Resource Recovery Facilities - Insights from the First Two Long-term Measurements in Ontario**
Emma Shen, Jacobs; Jesus Flores; Lucas Brandimarte Molleta, Ivan Miletic, Leiv Rieger, Jacobs Engineering; Joe Green, Regional Municipality of Durham; Jeff Medd, Regional Municipality of Waterloo

11:30 AM **Technical Brief 1: Advanced kinetic modelling for N2O mitigation, the Hessenpoort case**
Giacomo Bellandi, Roberta Muoio, AM Team; Tony Flameling, Drentse Overijsselse Delta; Wim Audenaert, Usman Rehman, AM Team

11:35 AM **Technical Brief 2: A proven N2O reduction framework for assessing, measuring, reducing, and monitoring nitrous oxide emissions from WRRFs**
Jose Porro, Cobalt Water Global, Inc.; Mostafa Khalil, modelEAU, Laval University; Julia Porro, Cobalt Water Global, Inc.

11:40 AM **Facilitated Discussion**

12:15 PM **Session Adjourns**

ITT Session 04: How DO Setpoints and Control Impacts Performance and Emissions

Wednesday, May 7, 2025
1:30 PM - 3:00 PM

1:30 PM **Full-Scale Low DO Implementation - Adapting Microbes and Operations**
Lee Pinkerton, Hannah Molitor, Kelsey Hogan, Yabing Nollet, Metropolitan Council; George Sprouse, Philip Sturm, Alexa Chesley, Metropolitan Council Environmental Services

1:45 PM **Distinguishing Comammox and AOB/NOB Kinetics within Low Dissolved Oxygen Wastewater Treatment**
Megan Wittman, Belinda Sturm, Yasawantha Hiripitiyage, University of Kansas; Jose Jimenez, Mark Miller, Kayla Bauhs, Brown and Caldwell

2:00 PM **Online In-Situ Nitrification Rate Measurement Using Existing Sensors for Kinetic Parameter Estimation and Control**
Kester McCullough, Lilian McIntosh, Alexandria Gagnon, Haley Morgan, Stephanie Klaus, Hampton Roads Sanitation District (HRSD); Peter Vanrolleghem, Université Laval; Charles Bott, Hampton Roads Sanitation District (HRSD)

2:15 PM **Technical Brief 1: Pursuing Low-Cost Operational Changes to Mitigate Nitrous Oxide at Two Halton Region WRRFs**
Jeremy Kraemer; John Duong, Halton Region; Chandra Baker, The Regional Municipality of Halton; Sanjeev Oberoi, Halton Regional Laboratory; Lizanne Pharand, Halton Region; Jose Porro, Cobalt Water Global, Inc.; Mikkel Andersen, Unisense; David de Haas, GHD; Liu Ye, University of Queensland; Bhavin Bhayani, Aby Sabzwari, GHD

2:20 PM **Technical Brief 2: Process Modeling and Aeration Control Design with ABAC for A/O SND Process with Densification**
Sara Arabi, Stantec; Cole Sigmon, Christopher Marks, City of Boulder; Chris Machado, Nathan Brown, Cody Charnas, Shelley Trujillo, Vrunda Patel, Stantec Consulting

2:25 PM **Facilitated Discussion**

3:00 PM **Session Adjourns**

ITT Session 05: How do we get to know our Flocs and Granules Better? Method Development for DAS Systems

Wednesday, May 7, 2025
1:30 PM - 3:00 PM

1:30 PM **Understanding the Kinetics of Densified Activated Sludge: Implications in Design and Optimization**
Kayla Bauhs, Jose Jimenez, Ahmed Al-Omari, Mark Miller, Manel Garrido, Brown and Caldwell; Daniel Freedman, Rudy Maltos, Metro Water Recovery; Patrick McGowan; Belinda Sturm, University of Kansas

1:45 PM **Theoretical Understanding and Successful Implementation of Kinetic Selection to Achieve Full-Scale Densified Activated Sludge (DAS)**
Yewei Sun, Haley Noteboom, Wendell Khunjar, Paul Pitt, Ron Latimer, Hazen and Sawyer

2:00 PM **Getting to Know Your Sludge Flocs - Density, Activity, and Morphology**
Keith Sears, AECOM

2:15 PM **Evaluating Full-Scale Impacts of Densified Activated Sludge on Disinfection Efficacy**
Brian Hilts, CDM Smith; Josh Goldman, Metro Wastewater Reclamation District; Rudy Maltos, Metro Water Recovery

2:30 PM **Facilitated Discussion**

3:00 PM **Session Adjourns**

ITT Session 06: Mitigation of N2O Part 1: Innovations in Quantification and Measurements

Wednesday, May 7, 2025
1:30 PM - 3:00 PM

Speakers: Amanda Lake, Jacobs; Nerea Uri Carreno, N118 Consulting; Charles Bott, Hampton Roads Sanitation District (HRSD); Samuel Reifsnyder, Carollo Engineers; Fabrizio Sabba, Black & Veatch; Otto Icke, Royal HaskoningDHV; Daniel Coutts, Suez; Belinda Sturm, University of Kansas; Mostafa Khalil, modelEAU, Laval University

- Overview of N2O sources and sinks in suspended growth and biofilm processes including current state of knowledge and key areas of ongoing work
- Measurement of N2O - latest innovations in N2O measurement including both process unit-level and site-level methods. Challenges and opportunities in liquid and gas phase measurement including importance of auxiliary process and operational data for quantification and analysis. Innovative approaches which combine N2O measurement with other process considerations (e.g. aeration efficiency, other GHGs).
- Quantification of N2O through conventional, demonstrated and emerging innovative methods. Opportunity for improved quantification of N2O through ML/AI methods to scale from limited measurement to site-wide. Overview of data-driven, biokinetic and hybrid modelling approaches and key applications/benefits of approaches and key examples.
- Process control-based mitigation of N2O - emerging approaches for model-based N2O control. Highlighting role of advanced process control for N2O mitigation. Optimising processes for N2O, energy and effluent quality case studies from Netherlands. Improving effluent quality does not need to be at expense of N2O.

ITT Session 07: Design and Control of Low Energy Nutrient Removal for Nutrient Performance and Emissions

Wednesday, May 7, 2025
3:45 PM - 5:15 PM

3:45 PM **Breaking Through the Low DO Barrier: Practical Design Guidance for Low DO and Suboxic Biological Nutrient Removal**
Michelle Young, Natalie Beach, Samuel Reifsnyder, Bella Dreher, Carollo Engineers; Tanja Rauch-Williams, Metro Water Recovery

4:00 PM **Practical Guidelines for Optimizing Aeration Control to Enhance Nitrogen Removal: A Case Study and Novel Control Approach**
Jacob Hatcher, George Washington University; Khoa Nam Ngo, DC Water; Chengpeng Lee, Northwestern University; Rahil Fofana, DC Water; George Wells, Northeastern University; Rumana Riffat, George Washington University; Haydee De Clippeleir, DC Water

4:15 PM **N2O Emissions from a Full-scale Wastewater Treatment Plant: Effects of Flow Modes and Key Operational Parameters.**
Marwan Al Saleh, Toronto Metropolitan University; Mostafa Khalil, modelEAU, Laval University; Ahmed Elsayed, Toronto Metropolitan University; Ahmed Alsayed, Northwestern University; Mohamed Zaghloul, Toronto Metropolitan University; Farokh Kakar, Katherine Bell, Shannon Cavanaugh, Ahmed Al-Omari, Brown and Caldwell; Elsayed Elbeshbishy, Toronto Metropolitan University

4:30 PM **Technical Brief 1: Microbial Dynamics and Nitrification-Denitrification Performance in a Unique Tertiary MBR System Once Dominated by Comammox**
Colin Fitzgerald, Jacobs; Michael Liu, LA County Sanitation District; Bryce Danker, Hazen and Sawyer; Rachel Deco, Bruce Mansell, Los Angeles County Sanitation Districts; Shannon Maceiko, MWD; Alan Ronn, Dian Tanuwidjaja, Joyce Lehman, Metropolitan Water District of Southern California; Timothy Constantine, Jacobs; Paul Pitt, Hazen and Sawyer

4:35 PM **Technical Brief 2: Balancing carbon, energy, and nutrients in activated sludge processes**
McKenna Farmer, Black & Veatch; Carolyn Coffey, Colorado School of Mines; Leon Downing, Black & Veatch; Cindy Qin, MWRD; Joseph Kozak, MWRD of Greater Chicago At Cicero Stickney WTP; Levi Straka, Metropolitan Water Reclamation District of Greater Chicago

4:40 PM **Facilitated Discussion**

5:15 PM **Session Adjourns**

ITT Session 08: How do you DAS?
Wednesday, May 7, 2025
3:45 PM - 5:15 PM

3:45 PM **The Many Side Quests of DAS: Full-Scale Design Considerations and Operational Insights**
Rudy Maltos, Daniel Freedman, Metro Water Recovery; Wendell Khunjar, Blair Wisdom, Anna Scopp, Ryan Priest, Alonso Griborio, Ron Latimer, Haley Noteboom, Yewei Sun, Alyssa Mayer, Hazen and Sawyer

4:00 PM **Controlling Densification at Best Operating Points for MBR and Clarifiers: Lessons Learned from Two-year of Operation at Full-scale Plants**
Sylvain Donnaz, Hui Guo, Christopher Shaw, Niclas Astrand, Jean Gagnon, Sheila Fyfe, Matt Reeve, Veolia Water Technologies & Solutions

4:15 PM **Hydrocyclone enabled sludge densification in full scale application without an anaerobic zone.**
Pranta Roy, Zhiwu Wang, Virginia Tech

4:30 PM **Investigation of Granules in a Flow-Through Activated Sludge System via Biological Selectors**
Kam Law, William Marten, Donohue & Associates, Inc.

4:45 PM **Facilitated Discussion**

5:15 PM **Session Adjourns**

ITT Session 09: Sidestream Management and Nutrient Recovery
Wednesday, May 7, 2025
3:45 PM - 5:15 PM

3:45 PM **Navigating the Challenges of Sidestream Nitrogen Removal: Insights from the Fond du Lac Wastewater Treatment & Resource Recovery Facility**
Carolyn Coffey, Colorado School of Mines; Isaac Avila; Cody Schoepke, City of Fond Du Lac; Leon Downing, Black & Veatch

4:00 PM **Put the Lime in the Blended Sludge and Shake it all up: Centrate P Removal Improves Secondary Performance**
Heather Stewart, Derek Lycke, Mengfei Li, Colin Fitzgerald, Allen Gelderloos, Jacobs; Keith Sanders, City of Ann Arbor WWTP; Nicholas Jaworski, State of Arizona; Jennifer Drinan, OHM Advisors

4:15 PM **Post Digestion Solids Treatment: Lessons Learned and Future Directions**
Thomas Worley-Morse, Metro Water Recovery

4:30 PM **Technical Brief 1: Resource Recovery in Controlled Environment Agriculture Using Integrated Anaerobic/Aerobic Membrane Bioreactors**
Kelsey Vought, Kennedy Jenks; Haimanote Bayabil, University of Florida; Ana Martin-Ryals

4:35 PM **Technical Brief 2: Bioremediation and Supplementation of Phosphorus Using Biochar from Genetically Modified DDP1 Plants**
Shashwat Dhanuka, Zhiwu Wang, Virginia Tech; Catherine Freed, UWM

4:40 PM **Facilitated Discussion**

5:15 PM **Session Adjourns**

ITT Session 10: Introduction to Machine Learning Approaches and Methods
Thursday, May 8, 2025
8:30 AM - 10:00 AM

8:30 AM **One Size Does Not Fit All: Navigating the Changing Landscape of Platforms and Approaches for Digital Twins in Wastewater Treatment**
Patrick Dunlap, Aryan Emaminejad, Chinmay Gaidhani, Isaac Avila, Kaming Leung, Caitlin Ruff, Eric Redmond, Leon Downing, Black & Veatch

8:45 AM **Designing and Implementing a Control Hierarchy for Full-Scale Hybrid Digital Twin Control: From Piloting to Safe and Highly Efficient Digital Twin Operation**
Leiv Rieger, Uri Papukchiev, Ivan Miletic, Dennis Gallien, Timothy Mason, Bruce Johnson, Jacobs

9:00 AM **Monitoring Pathogen Removal across RO on Cloud--a Systematic Approach to Data-Driven Process Monitoring and Controls**
Yoko Koyama, Carollo Engineers; Andrew Huang, Orange County Water District; Kyle Thompson, Carollo Engineers; Megan Plumlee, Han Gu, Jana Safarik, Orange County Water District

9:15 AM **Recurrent neural network based wastewater influent flow forecasting**
Binay Dahal, Ricky Arora, Metropolitan Council

9:30 AM **Facilitated Discussion**

10:00 AM **Session Adjourns**

ITT Session 11: Low DO Biological Nutrient Removal: Theory, Planning, Implementation, and Results Based on a Full-Scale Operations

Thursday, May 8, 2025
8:30 AM - 10:00 AM

Speakers: Michelle Young, Samuel Reifsnyder, Natalie Beach, Carollo; Philip Ackman, Thomas Weiland, LA County Sanitation District; Alex Ekster, Ekster & Associates; Tanja Rauch-Williams, Metro Water Recovery

This session will cover recent developments in operating biological nutrient removal (BNR) facilities at low dissolved oxygen (DO) levels, focusing on the potential for energy savings and system efficiency. Traditional BNR facilities typically maintain DO levels of 1.5-4 mg/L to ensure sufficient oxygen for ammonium oxidation, with aeration accounting for approximately 50% of a wastewater resource recovery facility's (WRRF) energy usage. Reducing DO is an area of growing interest due to its potential to significantly reduce this energy footprint. The session is divided into six presentations covering the basics of low DO operation across the United States, the role of microorganisms in low DO operation, and controls for low DO operations, plant modifications, and results of acclimating and operating a medium-sized WRRF at low DO. The session is anchored on findings from the Department of Energy-funded project, 'Transforming Aeration Energy in Water Resource Recovery Facilities through Suboxic Nitrogen Removal,' conducted by the Los Angeles County Sanitation Districts (LACSD) and Carollo Engineers. LACSD's Pomona Water Reclamation Facility (POWRF), a 15-mgd Modified Ludzack-Ettinger (MLE) activated sludge plant. Hydraulic loads into PWRF are relatively steady; however, PWRF receives high diurnal TKN influent load spikes. POWRF's goal was to operate its aeration basins under suboxic conditions, with DO concentrations maintained at or below 0.7 mg/L.

ITT Session 12: Control and Emission Considerations with Nitrite Production and Anammox Processes

Thursday, May 8, 2025
8:30 AM - 10:00 AM

8:30 AM **Primary Effluent- and Glycerol-Driven PdNA for Large-Scale Potable Reuse: Maximizing Benefits from MBBR to IFAS Transition**
Yewei Sun, Hazen and Sawyer; Mojtaba Farrokh Shad, Bruce Mansell, Ariana Coracero, Los Angeles County Sanitation Districts; Wendell Khunjar, Paul Pitt, Ron Latimer, Yian Sun, Hazen and Sawyer

8:45 AM **Startup of Partial-denitrification/anammox in an IFAS System with Low TIN Discharge Compliance**
Chengpeng Lee, Northwestern University; Khoa Nam Ngo, Md al Sadikul Islam, Jacob Hatcher, DC Water; Rumana Riffat, George Washington University; Hossain Azam, The University of the District of Columbia; George Wells, Northwestern University; Haydee De Clippeleir, DC Water

9:00 AM **Integrating Reverse A2O and Anammox with Arrested Anaerobic Digestion to Reduce Greenhouse Gas Emission from Water Resource Recovery Facilities**
Yewei Sun, Hazen and Sawyer; Rahamat Tanvir, University of Missouri; Zhangtong Liao, Virginia Tech; Yebo Li, quasar energy group; Matt Wiatrowski, National Renewable Energy Laboratory; Zhiqiang Hu, Univ of Missouri Columbia; Zhiwu Wang, Virginia Tech; Violeta Nogue, National Renewable Energy Laboratory; Xumeng Ge, quasar energy group

9:15 AM **Technical Brief 1: What's in the Box? Is Mainstream Anammox the Key to Solving South Platte Renew's Future Nutrient Challenges?**
Stephanie Fevig, City of Englewood, Colorado; Anna Schroeder, Brianna Miller, Mason Manross, South Platte Renew; Deena Davidson, Tetra Tech Inc; Jim McQuarrie, AECOM

9:20 AM **Technical Brief 2: The Impact of Carbon Source on Nitrite Accumulation During Biological Nitrogen Removal**
Leah Pifer, Bishav Bhattarai, Fabrizio Sabba, Leon Downing, Black & Veatch

9:25 AM **Facilitated Discussion**

10:00 AM **Session Adjourns**

ITT Session 13: Are Forever Chemicals Really Forever?
Thursday, May 8, 2025
10:45 AM - 12:15 PM

10:45 AM **A statewide analysis of per- and polyfluoroalkyl substances in Municipal Wastewater treatment plants in the State of Minnesota-Attribution of individual PFAS to specific industrial users**
Parnian Izadi, Caitlin Glover, Dr. Joe Jacangelo, Henry Croll, Stantec; Donald Ryan, Marquette University

11:00 AM **Elucidating PFAS Removal Mechanisms in Electrochemical Reactors: Overcoming Landfill Leachate Competition and Confirming PFAS Destruction.**
Omar Mohamed, Martha Dagnew, Western University

11:15 AM **Bench-Scale Comparison of PFAS Removal and Destruction Technologies in Landfill Leachate: A Comprehensive Study**
Fabrizio Sabba, Christian Kassar, Synthia Mallick, Gary Hunter, Leon Downing, Black & Veatch

11:30 AM **QACs: The Emerged Contaminants Nobody Is Talking About But Many Are Struggling With**
Andrew Shaw, Black & Veatch; Patrick McNamara, Marquette University; Ulrich Bazemo, Black & Veatch

11:45 AM **Facilitated Discussion**

12:15 PM **Session Adjourns**

ITT Session 14: Intensification of Anaerobic Digestion
Thursday, May 8, 2025
10:45 AM - 12:15 PM

10:45 AM **Pushing Feed Rates Beyond Limits to Accelerate Startup of THP Digestion: Insights from an In-Situ Pilot Study**
Yitao Li, Virginia Tech; Mary Strawn, Lisa Racey, Fasil Haile, Arlington County Water Pollution Control Bureau; Brian Balchunas, Chris Moline, HDR Engineering Inc.; Matthew Higgins, Bucknell University; John Novak, Zhiwu Wang, Virginia Tech

11:00 AM **Supercharging or Souring your Digesters: How you feed HSW matters**
Emma Guertin; Savanna Smith, North Carolina State University

11:15 AM **Evaluating the Economic and Operational Viability of Pre- and Post-Digestion Thermal Hydrolysis Processes with Thermal Drying at New York City WRRFs**
Alex Rosenthal, Krishnamurthy Ramalingam, The City College of New York; John Fillos, City College; Roland Jezek; Natalia Perez, NYCDEP; Sudhir Murthy, NEWhub Corp; Keith Hamilton, SEVAR AG

11:30 AM **Combining Thermal Hydrolysis with Advanced Thermal Conversion Processes for Micro-Contaminant Destruction**
William Barber, Cambi

11:45 AM **Facilitated Discussion**

12:15 PM **Session Adjourns**

ITT Session 15: Balancing Nutrient Removal, Settleability, and Emissions
Thursday, May 8, 2025
10:45 AM - 12:15 PM

10:45 AM **Understanding Emissions, Densification, and Nutrient Performance while Transitioning to Low Energy BNR at the Full Scale**
Gretchen Gutenberger, Leon Downing, Sara Sadreddini, Black & Veatch; Tyler Biese, Joe Watson, New Water, Green Bay Metro Sewerage District; Sarah Elger, John Koch, Taylor Jordan, EnviroMix

11:00 AM **Bringing It All Together: Designing a Densified AO/SND Process for Efficient Biological Nutrient Removal**
Nathan Brown, Sara Arabi, Stantec; Cole Sigmon, Christopher Marks, City of Boulder; Cody Charnas, Chris Machado, Shelley Trujillo, Stantec Consulting

11:15 AM **Towards Unifying Densification and Low TN / TP Operation at the South Durham Water Reclamation Facility**
David Wankmuller, Hazen and Sawyer; Dirk Cartner, Charles Cocker, City of Durham; Patricia Stiegel, Katya Bilyk, Yewei Sun, Ankit Pathak, Wendell Khunjar, Haley Noteboom, Hazen and Sawyer

11:30 AM **Technical Brief 1: Minimal N2O emissions and best effluent quality from day 1**
Giacomo Bellandi, Simon Duchi, AM-TEAM; Tom Weijtmans, Waterschap Aa en Maas; Kristin Isaksson, Malmberg; Qing Zhao, Kalmar Vatten; Usman Rehman, AM Team

11:35 AM **Technical Brief 2: Maximizing Efficiency and Augmenting Operational Decision Making: A Case Study of Hybrid Modeling at Fond du Lac Wastewater Treatment & Resource Recovery Facility**
Chinmay Gaidhani; Carolyn Coffey, Colorado School of Mines; Aryan Emaminejad, Patrick Dunlap, Isaac Avila, Black & Veatch; Keaton Lesnik, Maia Analytica; Cody Schoepke, City of Fond Du Lac; Leon Downing, Black & Veatch

11:40 AM **Facilitated Discussion**

12:15 PM **Session Adjourns**

ITT Session 16: Mitigation of N2O Part 2: Balancing N2O and Intensification
Thursday, May 8, 2025
1:30 PM - 3:00 PM

Speakers: Amanda Lake, Jacobs; Nerea Uri Carreno, N118 Consulting; Charles Bott, Hampton Roads Sanitation District (HRSD); Samuel Reifsnyder, Carollo Engineers; Fabrizio Sabba, Black & Veatch; Otto Icke, Royal HaskoningDHV; Daniel Coutts, Suez; Belinda Sturm, University of Kansas; Mostafa Khalil, modelEAU, Laval University

- Latest knowledge in intensification and N2O including how to shift technology and operational conditions to provide N2O sinks. This will include membrane aerated biofilm reactors (MABRs), membrane bioreactors (MBRs), densification and granular sludge configurations.
- Fundamentals of N2O linked to intensification with what we know, what can we expect from intensification and N2O? Given operational conditions and configuration of our existing and emerging intensification and innovative technologies, presentation and group discussion of what should we expect in terms of N2O and evidence to date.

ITT Session 17: Advanced Technologies for the Destruction of Emerging Contaminants in Water and Wastewater Treatment

Thursday, May 8, 2025
1:30 PM - 3:00 PM

Speakers: Naomi Senehi, Sudhakar Viswanathan, 374Water Inc.; Lloyd Winchell, Brown and Caldwell; Todd Williams, Jacobs; Valentino Villa, Bioforcetech Corporation; Jim Henderson, Heartland Water Technology; Michael Nicholson, Ecoremedy LLC; Levent Takmaz, Veolia Water Technologies & Solutions

As the water/wastewater/waste management sector faces growing pressure to address emerging contaminants, technologies such as plasma gasification, supercritical water oxidation, pyrolysis, gasification, and incineration offer promising pathways for effective destruction. Each technology presents unique advantages and challenges, from energy recovery to emissions control. This paper provides a comparative analysis of these technologies, focusing on their ability to destroy persistent contaminants and the potential environmental and economic benefits they offer. Future research and development in this field should focus on optimizing process conditions to maximize contaminant destruction while minimizing environmental impacts. As regulations evolve to address emerging contaminants, integrating these advanced technologies into existing wastewater treatment frameworks will be key to protecting public health and the environment.

ITT Session 18: Different Approaches to Diverting COD Upstream of Nutrient Removal Facilities

Thursday, May 8, 2025
1:30 PM - 3:00 PM

1:30 PM **Innovative approach for replacing chemically enhanced with optimal conventional primary treatment**
Hany Gerges, HDR; Jackie Yee, Steve Delight, Dublin San Ramon Services District; Michael Falk, HDR

1:45 PM **Optimization of Advanced Primary Treatment Technologies for Carbon Diversion and Management at Water Resource Recovery Facilities**
Onder Caliskaner, Derya Dursun, Yuanbin Wu, Caliskaner Water Technologies; Brian Davis, Linda County Water District; George Tchobanoglous, UC Davis; Everardo Martinez, Caliskaner Water Technologies, Inc.

2:00 PM **Understanding Settleability in High-Rate Activated Sludge Systems Using Video Analysis**
Yuang Li, DC Water; Arash Massoudieh, Catholic University of America; Rumana Riffat, George Washington University; Hossain Azam, The University of the District of Columbia; Khoa Nam Ngo, Haydee De Clippeleir, DC Water; Sakib Ahmad, The George Washington University; Arame Diop, Catholic University of America; Maria Ramirez, University of the District of Columbia; April Gu, Cornell University

2:15 PM **Evaluating Clarifier Capacity and Performance of a High-Rate Activated Sludge System**
Sakib Ahmad, The George Washington University; Yuang Li, Khoa Nam Ngo, DC Water; Arame Diop, Catholic University of America; Maria Mendoza, The University of the District of Columbia; Arash Massoudieh, Catholic University of America; Hossain Azam, The University of the District of Columbia; April Gu, Cornell University; Rumana Riffat, George Washington University; Haydee De Clippeleir, DC Water

2:30 PM **Facilitated Discussion**

3:00 PM **Session Adjourns**

ITT Session 19: Mitigation of N2O Part 3: How do we Achieve Low Energy, Low Influent Carbon, and Low N2O BNR?
Thursday, May 8, 2025
3:45 PM - 5:15 PM

Speakers: Amanda Lake, Jacobs; Nerea Uri Carreno, N118 Consulting; Charles Bott, Hampton Roads Sanitation District (HRSD); Samuel Reifsnyder, Carollo Engineers; Fabrizio Sabba, Black & Veatch; Otto Icke, Royal HaskoningDHV; Daniel Coutts, Suez; Belinda Sturm, University of Kansas; Mostafa Khalil, modelEAU, Laval University

- Methods advancement to support N2O understanding and abatement including low DO context and considerations.
- Shortcut process configurations - P/NA, PDNA - and latest N2O understanding including GHG, energy and carbon trade-offs and questions that remain for further research and innovation.

ITT Session 20: Electrified Resource Recovery and PFAS Remediation
Thursday, May 8, 2025
3:45 PM - 5:15 PM

Speakers: Shiqiang Zou; Yewei Sun, Conner Murray, Hazen and Sawyer; Mohan Qin, University of Wisconsin–Madison; Cameron Lippert, ElectraMet; Qingguo (Jack) Huang, University of Georgia; Thomas Igou, WaterTectonics; Jason Monnell, Tetra Tech; Shiqiang Zou

The wastewater industry faces growing pressure to enhance sustainability by recovering valuable resources, such as critical nutrients and metals, generating renewable energy, and producing reusable freshwater. Electrochemical engineering presents a promising solution to these challenges, but its practical application in wastewater treatment remains underdeveloped. This session will explore key challenges, including overcoming the electrochemical limitations of wastewater, efficiently converting persistent pollutants, and improving the recovery of diluted nutrients, metals, and organics. The focus will be on bridging electrochemical technologies with wastewater process engineering to drive real-world progress. Topics of interest will center on two main areas: (1) electrochemical systems for nutrient recovery and metal extraction from industrial and domestic waste streams, and (2) innovative techniques for degrading organic contaminants, particularly PFAS. We encourage submissions that demonstrate applied research and practical solutions, using either authentic wastewater or synthetic models that closely mimic industrial conditions. The aim is to offer actionable insights and scalable innovations that can accelerate the implementation of electrochemical processes in the wastewater industry.

ITT Session 21: Why would you implement MABR? Treatment, Capacity, and Emissions Considerations

Thursday, May 8, 2025
3:45 PM - 5:15 PM

3:45 PM **MABRs are neat , but how do I design them? A practical design methodology for hybrid MABR/AS**
Matt Reeve, Veolia Water Technologies & Solutions; Dwight Houweling, Dynamita North America Inc.; Eric Redmond, Francesca Cecconi, Black & Veatch

4:00 PM **Membranes Vs Concrete: Defining the value and limitations of hybrid MABR retrofits**
Jon Liberzon, Francesca Ceccone, Leah Pifer, Gretchen Gutenberger, Black & Veatch; Neri Nathan, Fluence; Leon Downing, Black & Veatch; Chever Ben Yosef, Yuval Nevo, Fluence

4:15 PM **Assessing the benefits of MABR for warm and cold climates**
Komal Rathore, Carollo Engineers; Nick Guho, University of Idaho; Anne Conklin, Andre Gharagozian, Carollo Engineers

4:30 PM **Solving the process intensification & N2O emission puzzle with MABR**
Daniel Coutts, Zebo Long, Jeff Peeters, Sylvain Donnaz, Veolia

4:45 PM **Facilitated Discussion**

5:15 PM **Session Adjourns**

ITT Session 22: Plan for it, Hope for it, and then Optimize it: Working Toward EBPR Optimization in Carbon Limited Systems

Friday, May 9, 2025
8:30 AM - 10:00 AM

Speakers: Leon Downing, Black & Veatch; Adrienne Menniti, Clean Water Services; Cameron Colby, Fox River Water Reclamation District; Cody Schoepke, City of Fond du Lac

This session will focus on three case studies where new approaches to understanding and optimizing EBPR processes will be discussed. The three core topics will be: rate testing to better understand the impacts of carbon type of EBPR performance and storage products; investigating production versus elutriation in fermentation to produce the right type and quantity of carbon; EBPR testing to understand storage compounds, uptake rates, and impacts of carbon type For several years, Clean Water Services has routinely measured the residual phosphorus uptake (RPU) rate as an operational tool to gauge BPR stability.

ITT Session 23: Automation, Analytics, and Decision Support for Operational Stability and Optimization

Friday, May 9, 2025
8:30 AM - 10:00 AM

Speakers: Prabhushankar Chandrasekeran, Arcadis; Zonetta English, Louisville & Jefferson County MSD; Tanush Wadhawan, Dynamita North America Inc.; Brian Persing, WSSC Water

This session will delve into the latest trends and best practices in automation, analytics, and decision support for wastewater professionals. Participants will gain a comprehensive understanding of how these technologies can be leveraged to achieve operational stability, optimize processes, and make data-driven decisions. The workshop will cover a range of topics, including: Automation Technologies: Explore the various automation technologies available for wastewater treatment plants, such as programmable logic controllers (PLCs), supervisory control and data acquisition (SCADA) systems, and advanced process control (APC) systems. Learn how these technologies can be used to automate routine tasks, optimize process parameters, and improve overall plant efficiency. Data Analytics and Machine Learning: Discover the power of data analytics and machine learning in extracting valuable insights from operational data. Learn how to use data-driven approaches to identify trends, anomalies, and potential issues before they escalate. Explore the use of predictive analytics to forecast future performance and optimize maintenance schedules. Decision Support Systems: Gain insights into the development and implementation of decision support systems (DSS) tailored to the specific needs of wastewater treatment plants. Learn how DSS can help operators make informed decisions, improve problem-solving, and enhance overall operational performance. Case Studies and Real-world Applications: Explore real-world case studies showcasing the successful implementation of automation, analytics, and decision support technologies in wastewater treatment plants. Learn from the experiences of industry experts and identify best practices for your own facility. Hands-on Workshops: Participate in hands-on workshops to plan and develop a quick roadmap for advancing automation, analytics, and the use of decision support tools.

ITT Session 24: Beyond Process: PdNA Design Innovations and Challenges
Friday, May 9, 2025
8:30 AM - 10:00 AM

Speakers: Pusker Regmi, Stantec; Ahmed Al-Omari, Brown and Caldwell; Christine deBarbadillo; Haydee De Clippeleir, DC Water

The adoption of Partial Denitrification-Anammox (PdNA) systems has marked a significant shift in the wastewater treatment sector, moving from a focus on process optimization to the complexities of system design. This session will explore this transition by presenting three distinct perspectives on the critical aspects of PdNA implementation: operations, design, and technology integration. Attendees will gain valuable insights into the practicalities of scaling PdNA technologies, and the collaborative efforts required to bring these systems from research to real-world application.

ITT Session 25: Management of Carbon to Maximize Phosphorus Removal
Friday, May 9, 2025
10:15 AM - 11:45 AM

10:15 AM **Enhancing Biological Phosphorus Removal: A Two-Year Comparative Study of a Full-Scale S2EBPR Process**
Khashayar Aghilinasrollahabadi, University of Maryland; Caroline Nguyen, Yerman Saavedra, WSSC Water; Birthe Kjellerup, Guangbin Li, Francis Schmidt, University of Maryland

10:30 AM **Interrogating EBPR Performance Data and Process Metrics to Refine Process Monitoring and Future Process Designs for Two Clean Water Services EBPR WRRFs**
Erik Coats, University of Idaho; Adrienne Menniti, Peter Schauer, Clean Water Services

10:45 AM **Evaluating Primary Sludge Fermentation in Existing Full-Scale Gravity Thickeners**
Shafkat Islam, George Washington University; Khoa Nam Ngo, DC Water; Jaydev Zaveri, Alexander Fitenko, Cornell University; Joshuan Mensah, The Catholic University of America; Rumana Riffat, George Washington University; Arash Massoudieh, Catholic University of America; April Gu, Cornell University; Haydee De Clippeleir, DC Water

11:00 AM **Full Scale Testing of Fermentation in Illinois**
Ethan Yen, Patrick Dunlap, Leon Downing, Black & Veatch

11:15 AM **Facilitated Discussion**

11:45 AM **Session Adjourns**

ITT Session 26: Different Paths to the Same Goal: Intensification of Biological Processes

Friday, May 9, 2025
10:15 AM - 11:45 AM

10:15 AM **Full Scale Hydrocyclone Demonstration at Charlotte Water's McDowell Creek WRRF: Case Study - Using Image Analysis to Quantify Foaming to Supplement Settleability and Treatment Performance Evaluation**
Muriel Steele, Charlotte Water; Isaac Avila, Black & Veatch; Christine deBarbadillo

10:30 AM **Implementation of kenaf as a ballasting agent for quick rescue to accidental loss of sludge settleability.**
Pranta Roy, Virginia Tech; Matt Brooks, Robert Angelotti, UOSA; Zhiwu Wang, Virginia Tech

10:45 AM **Insights from Biofilm Characterization in a Full-Scale Hybrid Membrane Aerated Biofilm Reactor**
Narasimman Lakshminarasimman; Michelle McKnight, Josh Neufeld, Wayne Parker, University of Waterloo

11:00 AM **Technical Brief 1: Designing hybrid MABRs to achieve intensified nutrient removal and low nitrous oxide emissions**
Kevan Brian, Waterco New Zealand; Sela Maka, Watercare; Nerea Uri Carreno, N118 Water Consulting

11:05 AM **Technical Brief 2: Reducing Capital Cost in Process Design with Digital Twins: A Case Study at Marine Park WRRF**
Cheng Yang, Bruce Johnson, Miaomiao Zhang, Matthew Noesen, Corey Klibert, Ivette Pinochet Troncoso, Jacobs; Frank Dick, City of Vancouver WA - Public Works

11:10 AM **Facilitated Discussion**

11:45 AM **Session Adjourns**

ITT Session 27: Application of Partial Denitrification in High Strength Wastewater
Friday, May 9, 2025
10:15 AM - 11:45 AM

10:15 AM **Pilot Scale Application of Partial Nitritation Anammox and Partial Denitrification Anammox Treating Industrial Waste with High Ammonia and Nitrate**
Joseph Wooten, Michael Parsons, Stephanie Klaus, Megan Bachmann, Hampton Roads Sanitation District (HRSD); Chandler Johnson, World Water Works, Inc.; Charles Bott, Hampton Roads Sanitation District (HRSD)

10:30 AM **Partial Denitrification-Anammox Treatment of Reverse Osmosis Concentrate**
Bruce Mansell, Ariana Coracero, Los Angeles County Sanitation Districts

10:45 AM **Zeolite-Enabled Partial Denitrification and Anammox (Pdna) in Recirculating Aquaculture Systems (RAS) with Extremely Low Ammonium Concentration**
Zhangtong Liao, Zhiwu Wang, David Kuhn, Virginia Tech

11:00 AM **Centrate Treatment Optimization: Alternative process control transitions to nitritation-denitritation and halves methanol consumption**
Matt Kowalski, AECOM

11:15 AM **Facilitated Discussion**

11:45 AM **Session Adjourns**